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Assessing the "humorous temperament": Construction of the facet and standard trait forms of the State-Trait-Cheerfulness-Inventory — STCI*

WILLIBALD RUCH, GABRIELE KÖHLER, and CHRISTOPH VAN THRIEL

Abstract

The present paper outlines the relevance of cheerfulness, seriousness, and bad mood for humor research. A state-trait model of exhilaratability is presented which incorporates the three concepts as both states and traits. Definitions of the concepts are undertaken utilizing a facet approach and the relationships among the three concepts are outlined. The construction strategy for the various forms of the German version of the State-Trait-Cheerfulness-Inventory (STCI) is outlined and the following versions of the trait form will be elaborated: (a) the pilot form with 122 items (STCI-T<122>); (b) a component (or long) form with 106 items (STCI-T<106>); (c) the standard form with 60 items (STCI-T<60>) and (d) the international form with 106 items (STCI-T<106i>). The development of the two forms, the replication of the psychometric characteristics, and the evaluation of the facet model utilized samples of German and American adults comprising more than 1,300 subjects altogether. The hypothesized facet structure emerged and appeared to be highly generalizable across the samples. The psychometric characteristics of the facets and scales appeared to be satisfactory. While there were no sex differences in any of the scales, seriousness increased steadily after age 40. Correspondence between self- and peer-evaluation was examined and turned out to be sufficiently high. The construction seemed to have been successful in providing a reliable instrument for the assessment of the temperamental basis of the sense of humor.

Introduction

All sorts of humor behavior can be considered to vary both *intraindividually* (i.e., across situations) and *interindividually* (i.e., among individuals).

We are all inclined to appreciate, initiate, or laugh at humor more at given times and less at others. This can be attributed to the *states* we are in. In other words, there are *actual* dispositions for humor which will vary over time. Irrespective of such temporal fluctuations, it can be observed that some people tend *habitually* to appreciate, initiate, or laugh at humor more often or more intensively than others do. Conceptually, we would refer to this as a *trait*, or personality characteristic. Traits are considered to be *enduring* dispositions; they are relatively stable over time. The detection of appropriate states and traits predicting or even explaining inter- and intraindividual differences in humor behavior and their implementation into humor theory could constitute an advancement in our understanding of the phenomenon.

The present article examines whether cheerfulness, seriousness, and bad mood as both states and traits can play such roles in the field of humor. In detail, a structural model of the three concepts is presented and evaluated. The present state of the development of the German version¹ of the *State-Trait-Cheerfulness-Inventory* (STCI) is reported.

The origin of the concepts: The study of the emotion of exhilaration

The need for a concept of cheerfulness as a state and a trait originated from research into the affective responses to humor. Ruch (1990, 1993) conceptualized the behavioral, physiological, and experiential responses to stimuli, such as humor, tickling, and laughing gas in terms of an emotion construct labeled exhilaration (or amusement). It was proposed that the term *exhilaration* be used according to its Latin root (*hilaris* = *cheerful*) to denote either the process of making cheerful or the temporary rising and fading out of a cheerful state (Ruch 1993).

The outline of the concept included the *exhilarants* (the stimuli and situations capable of inducing exhilaration) as well as the situational and organismic factors facilitating or inhibiting the release of exhilaration. Among the organismic variables, *actual* and *habitual* factors were distinguished. Within this framework, *cheerfulness* as a *mood state* and cheerfulness as a *personality trait* were both assigned prominent roles. Both should serve for controlling (predicting or explaining) individual differences in exhilaratability. *Cheerful mood* was seen to be the very state which facilitates the induction of exhilaration; it represents a state of enhanced preparedness to respond to an appropriate stimulus with smil-

ing and laughter. It was claimed that a concept of *cheerfulness* as an *enduring disposition* is also necessary, since individuals differ habitually in the frequency, intensity, and duration of cheerful mood states as well as in the ease with which exhilaration is induced (Ruch 1993). It was hypothesized that trait-cheerfulness can be subsumed under the higher-order temperament dimension of extraversion-introversion which is a determinant of a generalized susceptibility to positive affect (Eysenck and Eysenck 1985).

Thus, cheerfulness as a mood state (or a more tonic change in mood) should be separated conceptually from the emotion of exhilaration (as a *temporary rise in cheerful state*). A cheerful mood is characterized by longer duration, less fluctuation in intensity, and greater independence from an eliciting stimulus. Single incidents of exhilaration are of short duration and have a marked timing; typically, there is a more or less steep onset, a pronounced apex, and a generally less steep offset, all in all lasting, at most, a few seconds (Ruch 1993). Although conceptually different, exhilaration and the state of cheerfulness should be studied together, since it can be hypothesized that there is a reciprocal relationship between them. A cheerful state facilitates the induction of exhilaration, and an accumulation of exhilaration responses may lead to longer-lasting changes in the level of cheerfulness. Also, if the induction of exhilaration fails (for example, when a joke is told that is perceived as tasteless), the cheerful state may be lowered.

These state-related hypotheses yielded empirical support recently (Frost 1992; Köhler 1993; Ruch 1990, 1995); however, no study of cheerfulness as a *trait* has been undertaken yet. However, extraversion has been shown to predict frequency and intensity of humor-induced exhilaration behavior (Ruch 1994a, Ruch and Deckers 1993).

While cheerfulness as a state and a trait facilitates the induction of exhilaration, it was also claimed that antagonistic factors have to be considered as well; states and traits which impair the induction of smiling and laughter (Ruch 1990). A *serious* frame of mind, for example, was considered to be such a factor; a prevalent *bad mood* might constitute another.

Despite the fact that the prediction of individual differences in exhilarability was the original motive for postulating and examining these concepts, it is expected that the model to be presented is not only valid for *other forms of humor behavior* but transcends the boundaries of humor research as well.

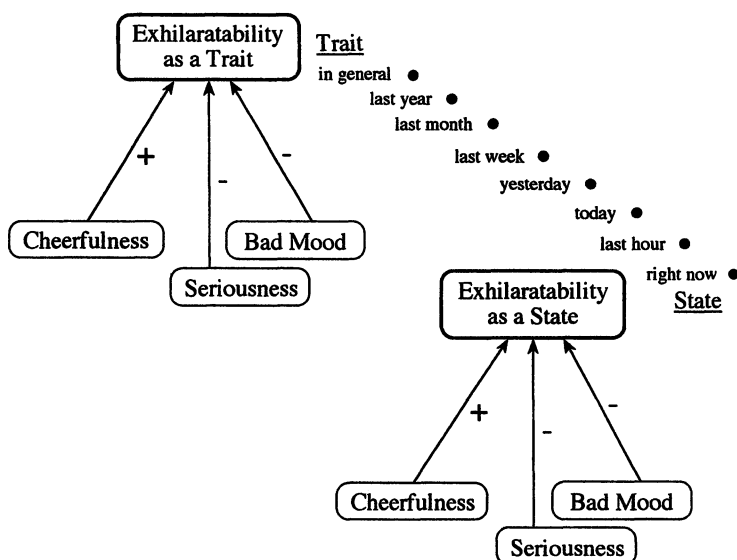


Figure 1. The model of state-trait-exhilarability.

A state-trait model of cheerfulness, seriousness, and bad mood

The state-trait model of cheerfulness, seriousness, and bad mood incorporates three concepts presumed to be related to exhilaratability (i.e., the lowered threshold for the induction of that emotion), namely *cheerfulness*, *seriousness*, and *bad mood*. The concepts are considered both as *states* and *traits*, i.e., as actual and habitual variables. The basic structure of the model is outlined in Figure 1 which shows that exhilaratability is composed of cheerfulness, seriousness, and bad mood. For all three concepts, a distinction of state- and trait-versions is undertaken. However, Figure 1 should also emphasize that there are, of course, different degrees of how long the different states are stable. That is, there may be short-lived fluctuations in mood but also more tonic changes in mood level. Nevertheless, a deliberate distinction is made whether the subjects report their actual feelings (in a given moment) or their habitual feelings and behavior.

Definition of the concepts

The *formal* definition of the three concepts is that they represent actual (state) and habitual (trait) dispositions for lowered (cheerful) and

enhanced (seriousness, bad mood) thresholds for the induction of exhilaration or other forms of humor behavior. In other words, for individuals in a *cheerful* state, the elicitation of exhilaration/amusement will be facilitated, while individuals in a more *serious* frame of mind or in a *bad mood* will be less readily inclined to laugh or smile at a given stimulus. Such states of seriousness, cheerfulness, and bad mood will fluctuate within individuals, but they may also be produced by experimental procedures to study *causal* hypotheses between states and the threshold for the release of exhilaration. While everybody is in a cheerful state now and then, individuals differ with respect to the frequency, duration, and intensity of occurrences of these states. Similarly, individuals of habitually higher levels of *cheerfulness* will be more susceptible to the induction of exhilaration than those of a comparable low level of cheerfulness; the reverse will be true for individuals with habitually high levels of *seriousness* or *bad mood* who will be less readily inclined to respond positively to a given stimulus than those low in these characteristics.

The *operational definitions* of the three concepts were arrived at with the help of *facets* or *definitional components* of the traits. These facets were derived on the basis of the following sources: lexical study (for example, definitions of the terms in encyclopedias of several languages); studies of the linguistic field (for example, of synonyms and antonyms); study of prior related concepts; study of the German literature on cheerfulness, seriousness, sadness, and ill-humor (primarily Lersch 1962); early American studies on cheerfulness-depression (for example, Washburn, Booth, Stocker, and Glicksmann 1926; Young 1937); prior factor analytic work of humor questionnaires (for example, Ruch 1994c); factor analytic studies of trait-adjectives; and further research findings. While the German phenomenological literature on the concepts (for example, the models of Lersch 1962, Meumann 1913, Schneider 1950) was particularly influential, the present definition of the concepts of cheerful, serious, sad, and ill-humored transcends by far the meaning of *Heiterkeit*, *Ernst*, *Traurigkeit*, and *Mißmut*, respectively, as understood by them. For example, the present conceptualization includes behavioral aspects as well; furthermore, no attempt to explicitly separate cheerfulness from merriment (*Lustigkeit*) was undertaken, and ill-humor and sadness were combined to form the global category of bad mood.

On the basis of the above mentioned sources, facets (or definitional components) for the three constructs were generated. There were five, six, and five such facets for cheerfulness, seriousness, and bad mood,

respectively. The concept of *cheerfulness* (CH) comprised the following five facets: a prevalence of cheerful mood (CH1), a low threshold for smiling and laughter (CH2), a composed view of adverse life circumstances (CH3), a broad range of active elicitors of cheerfulness and smiling/laughter (CH4), and a generally cheerful interaction style (CH5).²

The concept of *seriousness* (SE) is made up of the elements of the prevalence of serious states (SE1), a perception of even everyday happenings as important and considering them thoroughly and intensively (rather than treating them superficially) (SE2), the tendency to plan ahead and set long-range goals (and attaining the closest possible harmony with these goals in every action and decision) (SE3), the tendency to prefer activities for which concrete, rational reasons can be produced (thereby considering activities which don't have a specific goal as a waste of time and nonsense) (SE4), the preference for a sober, object-oriented communication style (for example, saying exactly what one means without exaggeration or ironic/sarcastic undertones) (SE5), and a "humorless" attitude about cheerfulness-related behavior, roles, persons, stimuli, situations, and actions (SE6).

The concept of *bad mood* (BM) is basically composed of the predominance of three mood states and their respective behaviors. These components are a generally bad mood (BM1), sadness (despondent and distressed mood) (BM2), and ill-humoredness (sullen and grumpy or grouchy feelings) (BM4). Two further facets are specifically related to the sad (BM3) and ill-humored (BM5) individual's behavior in cheerfulness evoking situations, their attitudes toward such situations and the objects, persons, and roles involved.

Thus, for all three concepts, there is at least one facet (CH1, SE1, BM1, BM2, BM4) to describe that the respective *state* occurs more often, lasts longer, and is of higher intensity than the average. These facets describe the postulated state-trait links (which remain to be tested) and already provide the first basic statements of the theoretical model yet to be outlined. Furthermore, for all constructs, at least one facet (CH5, SE6, BM3, BM5) describes the behavior of a prototypical person in a specifically cheerful environment or his/her response to exhilarating situations and stimuli and the generalized attitude toward that field.

It is expected that the facets of the three constructs are *homogeneous*; facets of one construct will tend to intercorrelate highly positively and there will be lower correlations with facets of other constructs. It is evident, however, that the facets describing the behavior of serious, sad,

or ill-humored individuals in the cheerful environment will relate negatively with the cheerfulness-construct (and particularly so with the facet describing the cheerful person's behavior in that very situation).

Thus, an evaluation of the facet model will have to be undertaken. It should be noted that alternative models will have to be tested as well. For example, one could hypothesize that there might be a bipolar cheerful versus sad/ill-humored dimension along with the seriousness factor. Another two-dimensional arrangement can be expected from the model by Meumann (1913). He considered *cheerfulness*, *seriousness*, and *grumpiness* as one of 12 basic temperaments and described them with the help of the two dimensions of *pleasure-displeasure* (separating cheerful from serious and grumpy) and *shallow-profound* nature (separating grumpy from cheerful and serious). Based upon the considerations of Schneider (1950), a *general* factor (cheerfulness versus bad mood/seriousness) might be expected as well. Schneider (1950) located seriousness on a *pleasure-displeasure* dimension as the first stage on the displeasure side. Cheerfulness (and amusement) and sadness were markers of the pleasure and displeasure sides, respectively.

Relationship among the three concepts

Cheerfulness and *bad mood* have in common that they are *affective* concepts; the hedonic tone of the former is positive and the latter negative. As states they appear to be opposites in that one can hardly be cheerful and in a bad mood simultaneously.³ The successful induction of a cheerful state seems to imply that it will replace the bad mood; that bad mood will cease in intensity. While they may not be present at the same time as *states*, there will be individuals predisposed to both states (for example, the cycloid temperament according to Kretschmer [1961]). Thus, at the habitual level, the negative correlation between cheerfulness and bad mood will be *lower* than at the state level. While the notion of a predominant (cheerful or bad) mood already implies a negative relationship, the strength of that intercorrelation may also depend on the *facet* of the trait. Facets CH1, SE1, BM1, BM2, and BM4 refer to prevalent states and are thus more prone to produce higher correlations. Whether one is able to laugh (CH2) or entertain others (CH5) is more independent of bad mood; it is claimed, for example, that clowns basically are sad people.

Also, an ill-humored mood may accompany the facilitated tendency of *laughing at others*.

Dictionaries often list *seriousness* as an antonym of *cheerfulness*; thus, they are considered to be mutually exclusive terms, suggesting that the presence of seriousness excludes cheerfulness and vice versa. However, while *cheerfulness* refers to a mood (or affective) state, *seriousness* denotes a quality of the frame of mind. The former is of an affective and the latter of an attitudinal nature. This allows all combinations of both to occur. The combination of *non-cheerful* and *serious* certainly contributes to the perception of a person as being humorless, and the combination of both *non-serious* and *cheerful* would depict a playful, fun-loving person and predict a high susceptibility for that person to laugh at humorous stimuli and situations. This is exemplified in several current sense of humor inventories. However, the other combinations will exist, too. For instance, a cheerful temperament might go along with a serious frame of mind. In fact, there is ample reason to assume that this combination is the basis for a certain form of sense of humor (see Ruch 1994b). Similarly, there may be the absence of both, as in nihilistic individuals characterized by pessimism/low degree of cheerfulness and low degree of seriousness.

Thus, *cheerfulness* (as an affective disposition) and *seriousness* (as a habitual frame of mind/view of and attitude toward the world) will be slightly negatively correlated as *traits*. The correlation between *cheerfulness* and *seriousness* as *states* will depend on whether the state is event-related and whether the event itself is of a serious or cheerful nature. For example, after having enjoyed a series of jokes, an individual's degree of cheerfulness will be high and the degree of seriousness low. During working periods or problem solving, the serious state will be pronounced, but cheerfulness may be both high and low.

The fact that both *seriousness* and *bad mood* represent opposites (or partial opposites) of cheerfulness limits the degrees of freedom for them being negatively correlated or orthogonal themselves. Phenomenologically, both share the elements of *heaviness* and *darkness* and lack the *brightness* and *lightness* of cheerfulness (Lersch 1962). Again, the fact that bad mood refers to an affective state and seriousness to a frame of mind allows them to vary more independently from each other. Serious people may be high and low in bad mood just as non-serious individuals. However, they react similarly negatively (albeit for different reasons and in a different manner) to humorous situations and stimuli. Thus, the facets of SE6, BM3, and BM5 (depicting the behavior of

serious, sad, and ill-humored individuals in the cheerful environment) will support a *positive* relationship between seriousness and bad mood. As *states*, seriousness and bad mood will be positively associated as well. As a prototype, during events of high negative emotionality (even flight or fight⁴), one is concentrated and behaving seriously; energy is mobilized to be spent purposefully. While bad mood situations may be associated often with a serious frame of mind, the reverse does not have to be true. States of seriousness do not have to be accompanied by a negative mood level. The intercorrelation of serious and bad mood states may increase in response to humorous events; the failure to induce exhilaration in state-serious individuals may increase their bad mood as well.

In conclusion, this leads to the expectation that cheerfulness will be negatively correlated with both seriousness and bad mood. The correlation will be lower for the former and higher for the latter. In the case of states, these correlations might be increased in size for non-salient situations (in the course of everyday life, baseline measurements in experiments). The intercorrelation may differ, however, in situations in which these states are induced.

Cheerfulness, seriousness, bad mood, and the "sense of humor"

The three constructs of cheerfulness, seriousness, and bad mood form nodes in a net of personality traits; they are considered to be closely related to some other personality constructs while unrelated to still others. Some relationships were already outlined (Ruch 1994b) and a few empirically verified. The evaluation of these nomological relationships included conceptually similar individual traits, general models of personality and temperament, and models of affectivity, but also a clarification of the role of these constructs in the domain of humor was undertaken (the relationship to humor behavior and humor related-traits were explicated). They will be elaborated in more detail in forthcoming publications relating to the validation of the STCI.

However, a few remarks are necessary relating to the utility of the STCI-concepts for humor research. The STCI is *not* a direct measure of "sense of humor"; rather it assesses traits forming the *temperamental basis of the sense of humor*. The position taken here is that the "sense of humor" is still more of a folk-concept; a lay-construct too vague and fuzzy from a scientific point of view. While it might have some communicative value in everyday language, it has not been explicitly converted

into a scientific construct so far; there is not yet an agreement on its formal (for example, is it a unipolar or bipolar concept) and content characteristics (for example, what components define it and which ones should not be counted). The approach taken here is to define precisely and explicitly some traits considered to be relevant for the domain of behavior a sense of humor concept should predict without using that concept. However, when developing the constructs we did not want to subdivide the realm of humor at the *conceptual* level or level of proposed humor *phenomena* (that is, draw *a priori* or theoretical distinctions of humor, such as humor appreciation, humor creation, or humor as a coping device) but search for traits which looked promising for predicting humor-related behavior. These traits should be of a general *temperamental* nature but specific enough to powerfully account for inter- and intraindividual differences in humor-related behavior and experience. Thus, while generally content-saturated humor items will be largely missing in the inventory, the nature of the concepts will still allow us to hypothesize links to humor phenomena.

Moreover, the utility of the STCI-concepts for humor research is given because a distinction among several forms of "humorlessness" is provided. While both serious individuals and those in a bad mood may be perceived as being humorless, they are so for different reasons. In the latter case, the generation of positive affect is impaired by the presence of a predominant negative affective state. In the former case, there is lowered interest in engaging in humorous interaction or in switching into a more playful frame of mind; a stronger aspect of volition is involved. There may be differences among the bad mood facets as well. While an ill-humored person like the serious person may not *want* to be involved in humor, the person in a sad mood may not be *able* to do so even if he or she would like to. Also, while the sad person is not antagonistic to a cheerful group, the ill-humored one may be.

Thus, the "humorous temperament" is composed of high cheerfulness, low seriousness and low bad mood. Whether or not they form a valid framework for the study of humor phenomena will have to be answered empirically.

Construction principles of the State-Trait-Cheerfulness-Inventory (STCI)

The State-Trait-Cheerfulness-Inventory (STCI) is aimed at assessing the three humor-related constructs of *cheerfulness*, *seriousness*, and *bad mood*

both as (actual) *states* and (habitual) *traits*. For both the trait (STCI-T) and state (STCI-S) parts of the inventory it seemed desirable to have different versions for different purposes available. Regarding the trait form the following German versions will be constructed: (a) a *component (or long) form*; (b) a *standard form* with 60 items (STCI-T <60>); and (c) a *short form* (30 items), i.e., the STCI-T <30>. The *long form* is needed for three purposes: to provide a valid assessment of the facets (or definitional components) of the constructs, to allow the empirical examination of the facet model postulated, and to allow a more specific testing of hypotheses related to the facets rather than the global constructs (when the global scales are providing information considered to be not specific enough). The *standard* and *short forms* will provide scores for the three concepts and will be preferred when higher reliability (differential diagnostics) and economy (for example, quick assessment) are emphasized, respectively.

Two versions of the state part (STCI-S) will be constructed: Form STCI-S <30> will be the *standard form* containing 10 items per scale. This form aims to provide a more reliable and fine-grained assessment of the three states, as it is needed, for example, in studies of *mood level*. A *short form* will contain about five items each to assess state-cheerfulness, seriousness, and bad mood. The short form is needed to assess *short-lived* changes, or *mood states*, in such cases when the assessment should be *quick* and *economic* and not interfere too much with the mood changes taking place (for example, in experiments).

In general, a *rational-theoretical construction strategy* will be pursued. The aforementioned facet model serves as the basis for deriving the items. Care will be taken that the items will be an adequate representation of the constructs. The generation of items will be based on some basic rules: (a) the items shall be short and understandable; (b) their content shall be diverse and cover the construct-related behavior and attitudes comprehensively; (c) the items shall be free from extreme levels of social desirability; (d) the items shall be applicable to adolescents and adults and not biased toward particular populations; and (e) the items shall be logically related to the constructs under consideration and at the same time not converged with similar but irrelevant constructs.

It did not seem possible to pursue a balanced keying of the items because of the antithetical nature of the concepts. A negatively keyed cheerfulness item could serve as well for facets SE6, BM3, or BM5. Before items were exposed to subjects, they were evaluated according to

the criteria outlined by Angleitner, John, and Löhr (1986): comprehensibility, ambiguity, abstractness, self-reference, and evaluation. The empirical part of the construction will utilize replication samples. The elimination of items will be based on explicit criteria and care will be taken that the structural model (and hence the meaning of the concepts) will be preserved. Thus, a concept-guided strategy in item reduction will be preferred to a purely empirical selection of items (as done in factor and item analysis).

While the STCI-T will be developed to provide a reliable and valid assessment of the outlined concepts (and their facets), care will be taken to evaluate the validity of the facet model itself. Thus, the homogeneity of the facets (a) as regards to their empirical correlation as well as to their perceived and directly estimated similarity, (b) independence of self- and peer-perspective, and (c) generalizability across different samples (males versus females, different nations) will be examined.

The present article will focus on the construction of the long and standard forms of the trait version. Their validation and the construction of the state version will be described elsewhere.

Construction of the trait version — STCI-T

Two preliminary forms of a trait-cheerfulness inventory were developed by students in seminars supervised by the senior author and have already undergone factor and item analyses. Starting with a different facet model than in the present article, already factors of seriousness and negative affect emerged from the first inventory although a unidimensional concept of cheerfulness (a general factor) was intended. The second version specifically investigated the two opposites of cheerfulness — seriousness and sadness — and again failed to constitute a general factor. The meaning of these two presumed opposites was quite narrow and a new and better defined item pool was considered necessary to assess seriousness and bad mood. Finally, the lack of theoretical foundation for those scales suggested the need to develop an entirely new and independent form of the inventory based on a theoretical model.

Generation of items by experts. Items were formulated on the basis of the above mentioned facets. For the trait-version of the STCI, three experts each formulated at least five items per facet, applying the aforesaid basic rules. Furthermore, the preliminary versions of the cheerfulness

inventory were screened, and a few items were considered to be suitable. This yielded an initial pool of 255 items. Eliminating redundant items, we arrived at a new pool of 238 statements. The next criterion for the exclusion of items was how well they suited the definitions of the facets. This prototypicality rating was given by the three experts, who also evaluated the remaining pool of 198 items according to the above mentioned criteria (Angleitner et al. 1986). This yielded the remaining set of 122 items, which were randomized and finally made up the pilot version of the STCI-T (i.e., the STCI-T <122>) which was used as the basis in the construction of the various final versions. There were 41, 45, and 36 items to measure cheerfulness, seriousness, and bad mood, respectively.

Subjects

Construction sample. This sample included 600 German subjects (241 men and 359 women), ages 14 to 83 ($M=33.90$, $SD=15.09$ years). They were heterogeneous with respect to sociodemographic variables. About two thirds of them were German students, the others were adults of the Düsseldorf area. This sample answered the STCI-T <122> and was used for constructing the long and standard versions of the STCI-T.

Similarity judgment sample. 19 German adults, ages 22 to 81 ($M=29.73$, $SD=16.62$), were asked to estimate the similarity or dissimilarity of the definitional components of the STCI-T. The 16 definitions were printed separately on small file cards. Ss were instructed to estimate all possible pair combinations (all in all 120, presented in two permutations) by the question which of the described facts generally occurred together, which were independent and which excluded the other. They were given 21-point bipolar rating scales (from “ $-10=A$ excludes B completely” over “ $0=A$ and B are independent” to “ $+10=A$ and B always occur together”). The 120 mean similarity estimates were divided by 10 (to match the range of correlation coefficients), repermuted and arranged in a “correlation” matrix.

Development of the STCI-T <106>

An item analysis performed for the pilot form (STCI-T <122>) showed that the psychometric characteristics for the total item pool were already

quite good. Cronbach α ranged from .64 to .91 for facets and from .91 to .93 for scales (see Table 1). However, several corrected item-total correlations were low or even negative. This suggested that it was necessary to eliminate certain items.

Starting with these results, the *facet version* or *long form* of the STCI-T was developed. Items were eliminated *iteratively* if they did not match one of the following criteria: (a) corrected item-total correlation (facet) $< .25$; (b) corrected item-total correlation (scale) $< .20$; (c) corrected item-total correlation (citic) with its own scale not exceeding the ones of any other scale for at least .05. Stepwise elimination of items (and intermittent evaluation of results) finally yielded a version with 106 items; the STCI-T $< 106 >$. The psychometric characteristics of this version are given in Table 2 which shows that the elimination of items improved the quality of the scales. While the Cronbach α for the facets did not suffer from the elimination of items, the coefficients for the scales even increased.

Table 1. *Psychometric characteristics of the facets and scales of the STCI-T <122>*

Facets/ scales	N_i	M	SD	α	citic		
					mean	min	max
CH1	8	24.67	4.69	.91	.72	.61	.80
CH2	7	21.75	3.42	.75	.47	.17	.68
CH3	8	23.96	3.84	.76	.46	.34	.62
CH4	8	24.29	3.74	.68	.38	.31	.52
CH5	10	31.96	4.45	.82	.50	.21	.61
CH	41	126.63	16.58	.93	.50	.16	.75
SE1	8	20.48	3.85	.72	.41	.29	.53
SE2	7	18.56	3.73	.75	.47	.36	.56
SE3	8	21.77	4.36	.76	.46	.31	.59
SE4	6	14.19	3.28	.64	.38	.25	.49
SE5	7	16.46	3.42	.64	.35	-.08	.59
SE6	9	18.71	4.92	.78	.47	.28	.60
SE	45	110.17	17.56	.91	.41	-.18	.59
BM1	7	14.28	3.67	.77	.50	.29	.63
BM2	9	20.32	5.19	.84	.55	.26	.72
BM3	6	12.08	3.19	.71	.44	.28	.54
BM4	7	14.71	4.04	.81	.55	.48	.65
BM5	7	14.31	3.65	.73	.44	.25	.55
BM	36	75.70	16.68	.93	.52	.19	.74

Notes: N_i = number of items per facet/scale.

α = Cronbach alpha.

citic = corrected item-total correlation.

Table 2. Psychometric characteristics of the facets and scales of the STCI-T<106> (construction sample)

Facets/ scales	N_i	M	SD	M/N_i	Sk	Ku	α	citc		
								mean	min	max
CH1	8	24.67	4.69	3.08	-.27	-.44	.91	.72	.61	.80
CH2	5	15.73	2.77	3.15	-.25	-.42	.76	.54	.38	.64
CH3	8	23.96	3.84	2.99	-.01	-.27	.76	.46	.34	.62
CH4	8	24.29	3.74	3.04	-.24	-.29	.68	.38	.31	.52
CH5	9	28.54	4.21	3.17	.26	-.51	.84	.54	.48	.62
CH	38	117.20	15.90	3.08	-.24	-.35	.94	.52	.22	.75
SE1	6	15.27	3.05	2.65	-.15	.07	.65	.39	.33	.44
SE2	7	18.56	3.73	2.67	-.07	-.12	.75	.47	.36	.56
SE3	7	18.72	3.98	2.49	-.25	-.10	.76	.48	.32	.59
SE4	5	12.43	2.93	2.44	-.34	.04	.64	.41	.28	.48
SE5	6	14.65	3.40	2.16	-.29	.30	.70	.44	.33	.60
SE6	6	12.95	3.69	2.04	-.24	.36	.74	.48	.36	.58
SE	37	92.58	15.79	2.50	-.12	.12	.91	.44	.24	.58
BM1	6	12.21	3.38	1.98	-.16	.29	.78	.53	.33	.65
BM2	8	17.56	4.89	2.10	-.24	.41	.85	.59	.46	.74
BM3	5	9.91	2.78	1.90	.04	.46	.73	.49	.36	.56
BM4	7	14.71	4.04	3.08	-.43	.28	.81	.55	.48	.65
BM5	5	9.49	2.88	2.50	.06	.57	.71	.47	.43	.50
BM	31	63.89	15.35	2.06	-.11	.38	.94	.56	.33	.76

Notes: $N=600$,

N_i =number of items per facet/scale.

Sk = skewness.

Ku = kurtosis.

α =Cronbach alpha.

citc=corrected item-total correlation.

Furthermore, the mean citc raised to .50 for facets and .51 for scales. None of the scales or facets deviated from normal distribution. The number of items ranged from 5 to 9 per facet, and from 31 to 38 per scale.

Evaluation of the facet model

The facet model asserts that the three concepts are (a) composed of homogeneous facets, (b) distinguishable, and (c) display a particular structural relationship. In order to examine the validity of these assumptions, first the intercorrelations among the facets were computed for the construction sample and are displayed in Table 3. These similarities/

Table 3. *Intercorrelations among the facets of the STCI-T < 106 >*

	CH1	CH2	CH3	CH4	CH5	SE1	SE2	SE3	SE4	SE5	SE6	BM1	BM2	BM3	BM4
CH2	.73														
CH3	.66	.50													
CH4	.54	.54	.50												
CH5	.67	.71	.50	.62											
SE1	-.25	-.25	-.10	-.22	-.25										
SE2	-.09	-.05	-.07	-.09	-.10	.49									
SE3	-.07	-.09	-.03	-.03	-.08	.40	.59								
SE4	-.10	-.13	.03	-.17	-.16	.47	.53	.56							
SE5	-.07	-.09	.04	-.16	-.19	.37	.53	.50	.49						
SE6	-.37	-.40	-.18	-.43	-.41	.49	.48	.38	.53	.55					
BM1	-.58	-.45	-.53	-.34	-.39	.14	.09	.02	.04	.04	.29				
BM2	-.57	-.38	-.55	-.34	-.37	.21	.24	.09	.06	.13	.33	.75			
BM3	-.59	-.50	-.48	-.48	-.50	.30	.30	.19	.24	.31	.51	.68	.71		
BM4	-.54	-.43	-.48	-.34	-.37	.19	.19	.13	.13	.17	.39	.79	.75	.70	
BM5	-.40	-.45	-.28	-.36	-.42	.34	.23	.15	.27	.22	.55	.51	.43	.58	.56

Notes: N = 600 (construction sample).

 $r > .13$; $P < .001$.

dissimilarities were supplemented by the *perceived* similarities among the definitional components as directly estimated.

Facet intercorrelations. Table 3 shows that there were consistently high positive intercorrelations among the facets of each scale. The average intercorrelation was .60 for cheerfulness (coefficients ranged from .50 to .73), .49 for seriousness (.37 to .59), and .65 for bad mood (.43 to .79). Cronbach α was computed by treating the facets of the scales as items. The coefficients were .87, .85, and .89 for cheerfulness, seriousness, and bad mood, respectively. All homologous facets were perceived to be *homogeneous* also in the *direct* judgments; the respective mean similarity coefficients for the three dimensions were .78, .52, and .51.

The proposed *structural relationship* between the three constructs yielded support by the average facet intercorrelations. The mean coefficient for the cheerfulness-seriousness-block was $-.15$ ($-.43$ to $.04$), the cheerfulness-bad mood-block was $-.44$ ($-.59$ to $-.28$), and the seriousness-bad mood-block was $.22$ ($.03$ to $.55$). While all seriousness facets were perceived to be negatively related to cheerfulness (average coefficient $-.39$) and positively related to bad mood ($.25$) in the expected range, the negative relationship between cheerfulness and bad mood was heavily overestimated ($-.78$) in the similarity judgment task.⁵

Overall, the two matrices of correlation-based and perceived similarities between the facets were highly comparable. Spearman rank correlation for the two vectors of 120 coefficients was .95, emphasizing the high similarity of the structural pattern of the facets.

Factor structure. Next, a principal components analysis was performed for the facet intercorrelations. Three factors exceeded unity (Eigenvalues were 6.51, 2.95, 1.38, .84, .68, .56, .51, and .43) and also the Scree-test suggested the retention of three factors which explained 67.8% of the variance. The unrotated solution is displayed in Figure 2 which confirms the model by showing that the facets of the respective scales form homogeneous clusters located around the centroids (average loadings of all facets of a construct). The location of the centroids indicates that the concepts are not orthogonal. An oblique rotation was undertaken, and the reference structure of the factors (as well as the principal components) are given in Table 4.

The factors were identified as *cheerfulness* (Factor 3), *seriousness* (Factor 2), and *bad mood* (Factor 1), explaining 17, 25, and 25% of the

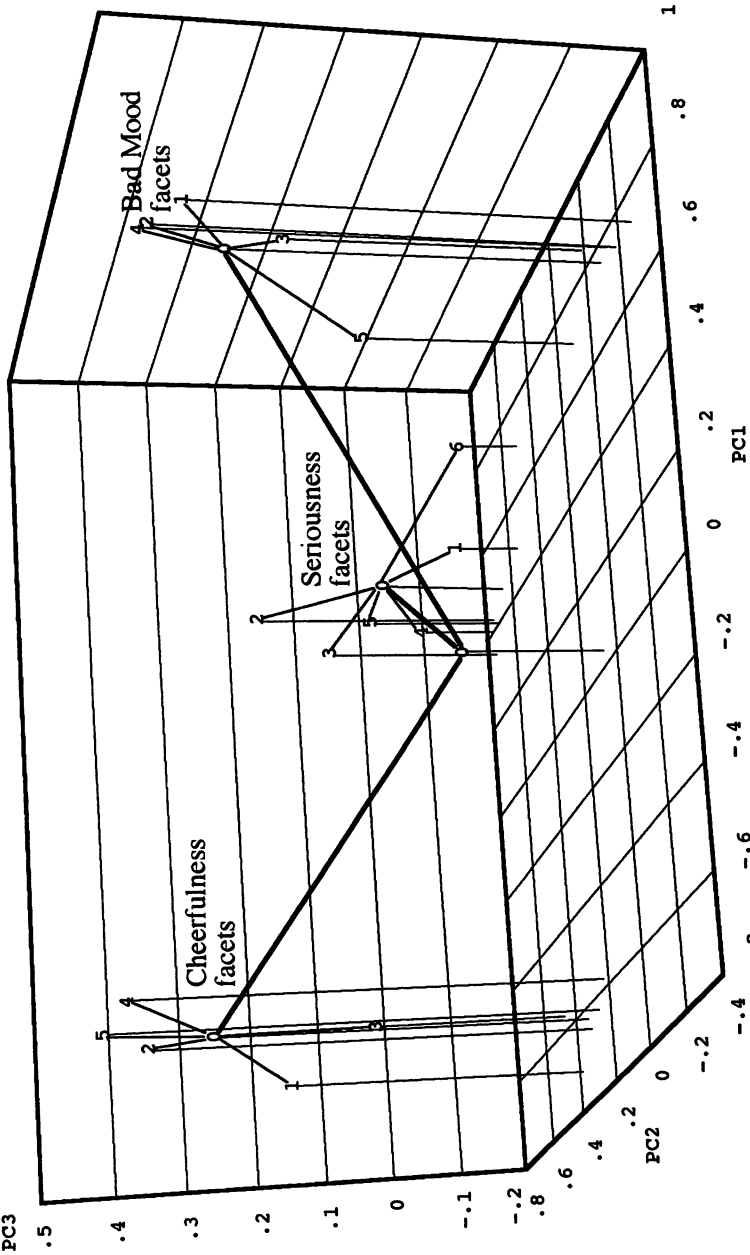


Figure 2. The 16 facets in an unrotated factor space (construction sample).

Table 4. Loadings of the 16 STCI-T<106> facets on the three unrotated and obliquely-rotated factors

	PC 1	PC 2	PC 3	Obl 1	Obl 2	Obl 3	SMC	h ²	α
Cheerfulness facets									
CH1	-.78	.32	.22	-.29	.05	.61	.72	.76	.91
CH2	-.71	.25	.42	-.07	-.01	.73	.65	.74	.76
CH3	-.63	.41	.08	-.37	.18	.45	.56	.58	.76
CH4	-.64	.16	.46	.02	-.06	.71	.51	.65	.68
CH5	-.70	.18	.49	.01	-.06	.77	.63	.77	.84
Seriousness facets									
SE1	.48	.50	-.11	-.01	.64	-.16	.39	.49	.65
SE2	.40	.69	.17	.13	.78	.16	.53	.66	.75
SE3	.32	.69	.06	-.00	.76	.11	.47	.58	.76
SE4	.38	.70	-.09	-.10	.79	-.05	.49	.64	.64
SE5	.38	.66	-.00	-.01	.75	.02	.49	.59	.70
SE6	.69	.44	-.11	.11	.64	-.27	.62	.67	.74
Bad Mood facets									
BM1	.73	-.35	.41	.80	-.10	-.05	.72	.83	.78
BM2	.74	-.25	.44	.79	.01	-.00	.71	.80	.85
BM3	.84	-.07	.23	.61	.20	-.18	.69	.76	.73
BM4	.76	-.21	.45	.80	.05	.00	.72	.82	.81
BM5	.69	.03	.11	.41	.26	-.19	.52	.49	.71

Notes: Expected loadings were italicized.

PC=unrotated factors (principal components).

Obl=reference structure.

SMC=square of multiple correlation (estimated communality).

h²=communality.

α =Cronbach alpha.

variance, respectively. The *cheerfulness* factor was loaded positively by all cheerfulness facets, confirming that the scope of the factor includes the components of the prevalence of cheerful mood and its maintenance under adverse life circumstances, a low threshold for and higher frequency of smiling and laughter, a receptivity to a broad range of elicitors of cheerfulness and smiling/laughter, and a generally cheerful interaction style.

The loading patterns on Factor 2 verified that the *seriousness* concept is composed of the elements of prevalence of serious states, the perception of everyday happenings as important and treating them thoroughly rather than superficially, the tendency to plan ahead and set far-reaching goals, the preference of activities for which concrete, rational reasons can be produced over nonsensical ones, a sober, object-oriented communication

style, and the maintenance of a serious frame of mind in the presence of active elicitors of cheerfulness.

The *bad mood* factor was loaded positively by all BM facets, thereby confirming the fusion of sadness and sullenness into one construct. Thus, bad mood comprises the elements of predominance of negative mood states, such as sadness, moroseness, ill-humoredness, sullenness, or grouchiness, and prototypical dispirited and grumpy behavior in cheerfulness evoking situations.

The correlations among the primary factors yielded support for the hypothesized direction and strength of the relationships among the concepts. Cheerfulness correlated mildly negatively with seriousness ($-.20$) and highly negatively with bad mood ($-.45$), and the two forms of humorlessness were slightly positively correlated ($.22$).

Factor analyses conducted for males and females separately yielded highly comparable patterns. Tucker's PHI coefficients were .96, .99, and .97 for cheerfulness, seriousness, and bad mood, respectively, confirming the validity of the facet model for both sexes.

Alternative models. Alternative structural models were evaluated as well. While Table 4 would suggest a bipolar *general* factor, the lack of intercorrelations of the seriousness-facets 2 to 5 with the cheerfulness- and bad mood-facets prohibited such a model (see Table 3). The Varimax-rotation of *two factors* yielded a very elegant solution of a bipolar factor loaded positively by cheerfulness and negatively by bad mood and a second, almost orthogonal, unipolar factor of seriousness. This solution would separate a *mood quality*-factor (cheerful versus sad/ill-humor) from a *frame of mind*-factor of seriousness. However, the fact that the third unrotated factor consistently (also in the replication samples) accounted for variance relating to cheerfulness and bad mood led to abandoning the two-factor-solution. It should be noted that cheerfulness and bad mood consistently yielded different results in the validation studies so that we were justified not to treat them as opposite poles of a single dimension. In addition, the principal components analysis for the perceived similarity yielded a very similar pattern of Eigenvalues (8.97, 2.91, 1.25, .73, .70, .50, .42), also suggesting the extraction of three factors.

Facet-scale correlations. The (part-whole corrected) correlations between the facets and scales as well as among the scales were computed and are presented in Table 5 which shows that each facet correlated most

Table 5. Scale-facet correlations for the STCI-T<106>

Scales/facets	STCI-T CH	STCI-T SE	STCI-T BM
CH	-.24		
BM	-.63	.32	
CH1	.79	-.21	-.63
CH2	.76	-.22	-.51
CH3	.64	-.07	-.56
CH4	.65	-.24	-.43
CH5	.75	-.26	-.47
SE1	-.26	.57	.27
SE2	-.10	.69	.24
SE3	-.07	.63	.13
SE4	-.13	.68	.15
SE5	-.12	.64	.19
SE6	-.43	.62	.47
BM1	-.56	.14	.82
BM2	-.54	.24	.78
BM3	-.62	.41	.79
BM4	-.53	.27	.84
BM5	-.46	.38	.57

Notes: The italicized values are part-whole corrected coefficients.

($N=600$).

$r>.13$; $P<.001$.

highly with its own scale. However, the facets of cheerfulness correlated highly negatively with bad mood and vice versa. As expected, cheerfulness and bad mood correlated highly negatively with each other while the correlations of both scales with seriousness were of a moderate size.

Effects of age and sex. In order to estimate the effects of sociodemographic variables, a series of 2×6 ANOVAs with sex and age (≤ 20 , 21–30, 31–40, 41–50, 51–60, >60 years) as independent and the STCI-T<106> scales as dependent variables was computed. Sex did not have an effect on STCI-T cheerfulness ($F[1,588]=.57$), seriousness ($F[1,588]=.29$), or bad mood ($F[1,588]=.01$). There also was no interaction between sex and age ($F[5,588]=.78$, .49, and .69, respectively). Regarding age, there was no effect for cheerfulness ($F[5,588]=1.43$) or bad mood ($F[5,588]=1.2$), but the age groups differed with respect to seriousness ($F[5,588]=31.45$, $P<.0001$). These differences are given in Figure 3 which shows that seriousness increased after age 40. Duncan-

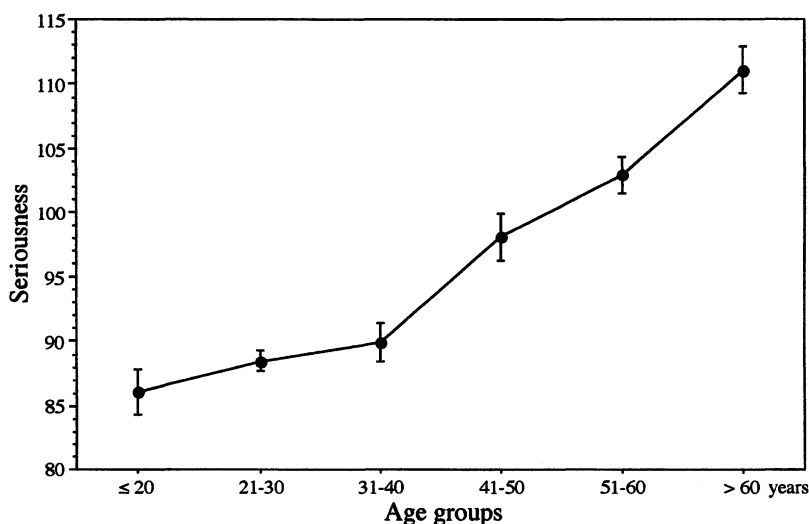


Figure 3. Age differences in STCI-T seriousness (means and standard error of measurement).

Tests revealed that while there was no difference in seriousness among the groups younger than 40 years, seriousness significantly (all $P < .05$) increased among all adjacent age groups thereafter.⁶ Thus, the full range of scores on the seriousness dimension will only be obtained if the sample includes subjects well over the age of forty years. This also suggests that in pure student samples variance will be reduced and — as a consequence — reliability will drop.

Development of the standard form STCI-T <60>

Next, the standard version (STCI-T <60>) of the STCI-T with 60 items was developed. This version contains items from all facets (at an equal proportion) but is not considered for scoring facets. It was constructed on the following basis: (a) the best citc, (b) consideration of items content, (c) roughly equal representation of the facets (where this was not possible, core facets got more weight), and (d) avoidance of very similar items as regards content or linguistic usage. There should be 20 items per scale.

The psychometric characteristics of the scales for the STCI-T <60> are given in Table 6 which shows that the reduction of items by almost 50% did not reduce the quality of the scales. Cronbach α for the scales

Table 6. Psychometric characteristics of the scales of the STCI-T<60> (construction sample)

Scales	N_i	M	SD	M/N_i	Sk	Ku	α	r	citc		
									mean	min	max
CH	20	61.06	9.60	3.05	-.32	-.35	.92	.93	.59	.40	.76
SE	20	48.89	9.69	2.44	.08	-.12	.88	.88	.48	.28	.58
BM	20	39.59	10.95	1.98	.52	-.07	.93	.94	.62	.41	.79

Notes: $N=600$ (German adults answering the STCI-T<122>).

N_i =number of items per scale.

α =Cronbach alpha.

r =split-half reliability (Spearman-Brown correction).

citc=corrected item-total correlation.

decreased only to a small extent, and the mean citc even increased to .56. Split-half reliabilities (Spearman-Brown correction) roughly equaled Cronbach α coefficients. All scales were normally distributed. The size of the intercorrelations among the scales was reduced as compared to the STCI-T<106> (CH vs. SE -.23, $P<.01$; CH vs. BM -.63, $P<.001$; SE vs. BM .23, $P<.01$).

Replication studies

For replicational reasons, several independent samples were tested with the different versions of the STCI-T. In detail, it could be tested (a) whether the test-characteristics for the STCI-T<106> could be replicated in two independent samples (one with the pilot version STCI-T<122>, the other with the reduced item pool; STCI-T<106>); (b) whether the pattern of facet-intercorrelations remained stable in the different samples; (c) whether the factor structure was generalizable across different samples, including the peer-evaluation and the United States samples; and (d) whether the psychometric characteristics of the standard version (STCI-T<60>) could be replicated.

Generation of the peer-evaluation facet form. A peer-evaluation facet form was generated by reformulating all 106 items in a he/she-version and by adapting the instructions accordingly. The degree of acquaintance between rater and ratee was assessed by asking for (a) the number of

years knowing each other, (b) the average number of hours spent together during a regular week, and (c) a nine-point overall rating of the degree of acquaintance.

Generation of the English pilot facet form. This translation of the STCI-T took place in several steps. In Step 1, all 106 items were translated into English by two people (one of them a German, the other a native English speaker living in Germany for 30 years⁷) independent of another. Step 2 included a comparison of both translations, discussions about linguistic peculiarities and the intent of several items, and ended with a first translated item list (for some items alternative versions were kept). In Step 3 this list was checked independently by two humor experts familiar with the concepts and native speakers of English. Their corrections were examined for their correspondence as regards the items' content and taken over to a large extent. In a final step, this modified list was discussed with further two American researchers by the senior author, resulting in the international version STCI-T <106i> (Ruch, Köhler, Deckers, and Carrell 1994) which will serve as the pilot version for adaptation in different cultures.

Subjects

Replication sample I. This sample included 167 adults (86 men and 81 women) aged 16 to 75 ($M=34.70$, $SD=15.74$ years). 95 of these subjects were students of the University of Düsseldorf, the rest were adults of the Düsseldorf area. These subjects answered the pilot version of the STCI-T with 122 items and were used for an independent evaluation of the psychometric characteristics found for the construction sample.

Replication sample II. This sample comprised 193 subjects (84 men and 109 women), between the ages of 18 and 74 years ($M=31.84$, $SD=14.49$ years). 155 of those were students, the others were adults of the Düsseldorf area. These subjects filled in the long version of the STCI-T (STCI-T <106>) with 106 items and were used for an independent evaluation of the psychometric characteristics of the reduced item-pool.

Peer evaluation sample. Subjects were 100 students (53 women, 47 men) of different fields with the exception of psychology. Their age ranged

from 18 to 51 years ($M=26.05$, $SD=7.82$ years). They filled in the pilot version of the STCI-T and chose three close acquaintances each who rated them on the peer-evaluation form of the STCI-T <122>. The subjects were instructed to choose three friends or relatives who know them well enough to give a valid evaluation. The peers rated how well they know the target subject on a nine-step scale and also gave other information related to degree of acquaintance.

United States sample. 220 undergraduate students of the University of Central Oklahoma (119 women and 91 men) answered the English pilot version STCI-T <106i>. Mean age was 27.70 years ($SD=9.19$, min = 17, max = 58 years).

Replication sample III. Subjects were 125 German adults (54 men, 71 women; one third of them psychology students in introductory courses, the others their friends and relatives) who answered the STCI-T <60>. Their age ranged from 16 to 72 years ($M=35.30$, $SD=14.83$ years).

Psychometric characteristics of the STCI-T <106> and STCI-T <60>

The psychometric characteristics of the STCI-T <106> in the replication samples were evaluated and are presented in Table 7 which shows that the psychometric characteristics were essentially confirmed for the two replication samples. Most of the alpha coefficients and the mean item-total correlations for the scales and facets equaled or even exceeded the coefficients of the construction sample. The rank-order of the item-total correlations was comparable to the construction sample both for replication samples I (.87) and II (.82). Reapplication of the criteria used for the selection of items in the construction sample yielded that criterion (a) (citc [facet] < .25) was violated by 10 (replication sample I = 1, replication sample II = 9) items (4.7%) and that the citc (scale) (criterion b) was lower than .20 for 5 (replication sample I = 2, replication sample II = 3) items (2.3%). Criterion (c) yielded 29 (replication sample I = 13, replication sample II = 16) out of 424 potential violations (6.8%).

There was no deviation from normality. However, some peculiarities need to be discussed. For replication sample II, all Cronbach α s (and the item-total correlations, thus yielding the major number of violations of the criteria) of the seriousness facets and the scale were lower than for

Table 7. *Psychometric characteristics of the facets and scales of the STCI-T<106> in the replication samples*

Facets/ scales	Replication sample I						Replication sample II					
	<i>M</i>	<i>SD</i>	<i>Sk</i>	<i>Ku</i>	α	cite	<i>M</i>	<i>SD</i>	<i>Sk</i>	<i>Ku</i>	α	cite
	mean min max						mean min max					
CH1	23.77	5.12	-.44	-.22	.94	.79	23.76	5.00	-.53	.13	.93	.76
CH2	15.57	3.10	-.51	-.13	.83	.64	15.87	2.95	-.83	.58	.81	.61
CH3	24.35	3.73	-.28	-.01	.78	.48	23.41	3.63	-.33	-.09	.73	.42
CH4	24.77	3.99	-.37	.05	.75	.47	24.72	3.54	-.71	1.76	.67	.37
CH5	28.60	4.52	-.61	.44	.87	.61	28.74	4.47	-1.08	1.88	.86	.59
CH	117.07	17.98	-.40	-.08	.96	.60	116.50	16.78	-.74	.73	.95	.55
SE1	15.47	3.06	.04	-.23	.69	.43	16.24	2.93	.01	-.38	.62	.36
SE2	18.28	4.11	-.11	.02	.79	.52	18.26	3.24	-.07	.17	.66	.37
SE3	17.98	4.11	-.02	-.33	.79	.52	18.74	3.44	.14	-.44	.67	.39
SE4	12.01	3.23	.11	-.26	.74	.51	12.63	2.43	.27	-.42	.43	.23
SE5	14.44	3.41	.32	-.19	.69	.42	14.91	2.71	.47	.26	.54	.29
SE6	12.66	3.86	.29	-.36	.79	.54	13.13	3.40	.08	-.72	.68	.41
SE	90.84	17.35	.14	-.04	.93	.49	93.91	12.76	.06	.37	.86	.35
BM1	12.50	3.51	.31	-.16	.79	.55	12.82	3.53	.36	-.01	.78	.54
BM2	17.75	4.85	.33	-.31	.85	.60	18.70	5.14	.16	-.33	.86	.62
BM3	10.23	3.05	.49	.04	.77	.55	9.79	3.02	.68	.24	.75	.51
BM4	15.25	3.99	.26	-.42	.80	.54	15.49	4.49	.17	-.54	.85	.61
BM5	9.66	3.16	.44	-.22	.79	.57	9.94	2.90	.27	-.52	.69	.45
BM	65.38	15.62	.35	-.15	.94	.56	66.75	16.35	.35	-.13	.94	.57

Notes: *N* = 193 (replication sample I), *N* = 167 (replication sample II). *Sk* = skewness. *Ku* = kurtosis. α = Cronbach alpha. cite = corrected item-total correlation.

the construction sample (which was, in turn, lower than replication sample I). This can be explained as being a function of the size of the variance (which was lowest in sample II and highest in sample I) which, in turn, seems to be a consequence of the different age range covered by the three samples. No such effects were observed for cheerfulness and bad mood, which, of course, are not related to age. All in all, it can be concluded that the test statistics of the long or component form of the inventory are stable.

Regarding the STCI-T <60>, replication data are available from the replication sample I (answering the STCI-T <122>), the replication sample II (answering the STCI-T <106>), and replication sample III answering the new STCI-T <60>. The psychometric characteristics and scale-intercorrelations are given in Tables 8 and 9, respectively.

Table 8 shows that the psychometric characteristics were essentially confirmed for the *replication samples*; this is especially noteworthy for *replication sample III* which responded only to the STCI-T <60> items.

Table 8. *Psychometric characteristics of the scales of the STCI-T <60> in the replication samples*

Scales	<i>M</i>	<i>SD</i>	Sk	Ku	α	r	citic		
							mean	min	max
Replication I									
CH	60.44	10.57	−.28	−.37	.94	.96	.66	.44	.82
SE	48.17	10.51	.48	−.16	.90	.90	.53	.25	.66
BM	40.76	10.80	.41	−.18	.93	.94	.61	.44	.77
Replication II									
CH	60.32	9.85	−.55	.29	.93	.93	.60	.30	.79
SE	50.25	7.95	.11	.10	.81	.81	.38	.16	.57
BM	41.97	11.63	.42	−.14	.93	.93	.62	.33	.80
Replication III									
CH	58.43	10.69	−.56	.17	.92	.93	.58	.31	.82
SE	47.86	8.53	.47	.26	.81	.80	.38	.22	.58
BM	57.34	12.25	.48	−.51	.93	.93	.60	.28	.76

Notes: Replication I: $N=167$ (German adults answering the STCI-T <122>);

Replication II: $N=193$ (German adults answering the STCI-T <106>);

Replication III: $N=125$ (German adults answering the STCI-T <60>).

Sk = skewness.

Ku = kurtosis.

α = Cronbach Alpha.

r = split-half reliability (Spearman-Brown correction).

citic = corrected item-total correlation.

Table 9. *Intercorrelations among the STCI-T<60> scales in the replication samples*

	CH versus SE	CH versus BM	SE versus BM
Replication I	-.43***	-.64***	.24**
Replication II	-.35***	-.63***	.36***
Replication III	-.30***	-.50***	.14

Notes: Replication I: $N=167$ (German adults answering the STCI-T<122>);
Replication II: $N=193$ (German adults answering the STCI-T<106>);
Replication III: $N=125$ (German adults answering the STCI-T<60>).
** $P<.01$, *** $P<.001$.

The rank-order of the item-total correlations was comparable to the construction sample for all replication samples (I = .82; II = .85; III = .85). Thus, context effects were minimal. The scales' intercorrelations were comparable, too (see Table 9). The effects of reduced variance on the internal consistency (Cronbach α and split-half reliability), demonstrated for replication sample II, was also inherent in replication sample III.

Generalizability of the facet structure

The intercorrelations among the 16 STCI-T<106> facets were computed for the replication samples I and II, the peer evaluation sample, and the United States sample. The facet structure of each sample appeared to be highly comparable to the construction sample; Spearman rank order correlations (computed across vectors of 120 coefficients, i.e., all off-diagonals) were .98, .97, .99, and .97.

Principal components analyses were performed for the facet intercorrelations for the four samples separately. The respective Eigenvalues are displayed in Figure 4 which clearly shows that in each of the four samples three Eigenvalues exceeded unity, and the Scree-test also suggested the extraction of three factors each, which explained 66–82% of the variance. Hence, three factors were extracted and obliquely rotated for each sample. Their reference structures are given in Table 10 which shows that the factor structure was generally highly comparable among the four samples as well as with the construction sample (see Table 4), confirming the postulated facet structure model. However, in the peer evaluation sample, facet CH3 showed only a small positive loading on the cheerfulness

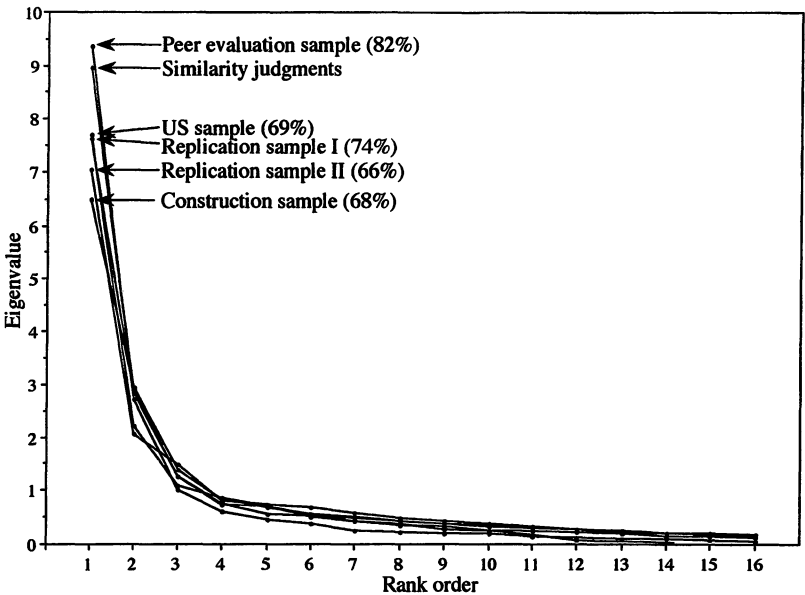


Figure 4. Eigenvalue plot for all six samples (and the percentage of explained variance).

factor.⁸ In replication sample I, the peer evaluation sample, and the United States sample, the three concepts seemed to be more highly intercorrelated than in the construction sample and replication sample II.

Taken together, these five samples allow for an evaluation of stable second loadings of the facets. As expected, the cheerfulness factor was loaded negligibly but consistently negatively by SE6 (average loading = $-.28$), BM3 ($-.25$), and BM5 ($-.20$); i.e., the facets comprising the humorless attitudes and feelings in cheerful situations. Moreover, BM5 (sullen interaction style in humorous situations) but not BM3 also loaded consistently positively ($.23$) on seriousness, confirming the more *volitional* element in the grumpy behavior responding to a cheerful environment. The predominant cheerful mood (CH1: $-.24$) and the maintenance of cheerful mood under adverse circumstances (CH3: $-.35$) loaded negatively on the bad mood factor demonstrating that these two components of cheerfulness are more antagonistic to negative affect than the facets of laughing easily, liking of humor stimuli, and a humorous/cheerful interaction style are.

With the aim to estimate the similarity of the factor patterns, Tucker's PHI coefficients were computed for pairs of homologous factors of the different samples and are presented in Table 11.

Table 10. *The oblique factors (reference structure) in four different samples*

STCI-T facets	Factor Cheerfulness					Factor Seriousness					Factor Bad Mood				
	II	III	IV	V		II	III	IV	V		II	III	IV	V	
CH1	.64	.72	.41	.59		.04	.06	.02	.11		-.14	-.23	-.38	-.17	
CH2	.68	.78	.56	.62		-.02	-.01	-.05	-.05		-.01	-.04	-.18	-.02	
CH3	.57	.50	.02	.51		.23	.06	.02	.18		-.24	-.34	-.64	-.15	
CH4	.71	.71	.59	.68		.00	-.18	-.12	-.13		.08	.04	-.07	.12	
CH5	.67	.80	.62	.70		-.05	-.06	-.01	-.08		.00	-.00	-.12	.05	
SE1	-.09	.05	.03	.05		.51	.45	.65	.62		.12	.27	.28	.06	
SE2	.25	.17	.25	.28		.79	.64	.78	.62		.11	.32	.33	.36	
SE3	.13	.04	.08	-.03		.77	.66	.81	.71		-.06	.13	.01	-.08	
SE4	-.09	-.12	-.10	-.06		.76	.68	.82	.73		-.25	-.25	-.13	-.11	
SE5	.03	-.05	-.20	.04		.78	.72	.62	.66		-.18	-.06	.00	-.04	
SE6	-.26	-.23	-.32	-.30		.53	.63	.47	.56		.03	-.02	.14	-.03	
BM1	-.11	-.08	.01	-.04		-.20	-.01	-.12	-.00		.72	.77	.74	.65	
BM2	.01	-.10	.13	-.14		-.18	-.06	-.08	-.12		.76	.76	.82	.61	
BM3	-.18	-.36	-.21	-.31		.18	.23	-.01	.09		.48	.46	.57	.36	
BM4	.02	-.06	.01	-.00		.00	.07	-.05	.08		.74	.77	.73	.65	
BM5	-.27	-.23	-.11	-.22		.16	.28	.20	.25		.32	.42	.51	.31	
Primary factor correlations															
Factor CH						-.49	-.26	-.39	-.41		-.57	-.40	-.64	-.63	
Factor SE											.41	.27	.29	.42	

Notes: II = replication sample I ($N = 167$), III = replication sample II ($N = 193$), IV = peer-evaluation sample ($N = 100$; aggregated data), V = US sample ($N = 220$).

Table 11. *Stability (Tucker's PHI) of homologous factors across the five samples*

	Const.	Rep. I	Rep. II	Peer
Cheerfulness				
Rep. I	.99			
Rep. II	.98	.98		
Peer	.92	.89	.91	
US	.97	.98	.99	.90
Seriousness				
Rep. I	.99			
Rep. II	.99	.97		
Peer	.98	.97	.96	
US	.99	.98	.98	.98
Bad Mood				
Rep. I	.97			
Rep. II	.96	.97		
Peer	.96	.93	.96	
US	.96	.96	.97	.92

Notes: Const. = construction sample ($N=600$; $STCI-T < 122 >$);

Rep. I = replication sample I ($N=167$, $STCI-T < 122 >$);

Rep. II = replication sample II ($N=193$; $STCI-T < 106 >$);

Peer = peer evaluation sample ($N=100$, aggregated 3 peer-ratings;
 $STCI-T < 122 >$);

US = United States sample ($N=220$, $STCI-T < 106i >$).

Nearly all coefficients of Table 11 were exceeding .90, indicating a high similarity of the factor structures in all samples. Thus, one can conclude that the facet model received strong support from self- and peer evaluations, from German and American samples, and this is the justification for using all facets to define the concepts (and the scoring of the three scales).

Correspondence between self- and peer-evaluation

The peer ratings of the peer-evaluation sample were averaged across the three raters. Means, standard deviations, t-tests between self- and peer-evaluations as well as their correlations were computed for facets and scales (see Table 12).

Table 12 shows that self-ratings were significantly higher than peer-ratings for three *cheerfulness* facets and for the total scale. This indicates that subjects consider themselves able to laugh more often (CH2), over a more diverse range of stimuli (CH4), and remain cheerful even under

Table 12. Means, standard deviations, Cronbach alphas, and correlations between self- and peer-evaluation in the STCI-T

Facets/ scales	Self		Peer		t-tests	α		Self-peer congruence			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		Self	Peer	r_{1p}	r_{2p}	r_{3p}	r_{3p**}
CH1	24.61	5.13	24.39	4.41	.534	.94	.93	.51	.59	.63	.66
CH2	15.43	2.90	14.81	2.57	2.646**	.81	.83	.51	.60	.63	.64
CH3	23.69	3.91	22.49	3.60	3.021**	.78	.85	.35	.42	.45	.47
CH4	24.93	3.65	23.89	3.16	3.233**	.71	.76	.45	.53	.56	.56
CH5	28.50	4.14	28.31	4.07	.495	.84	.90	.45	.52	.55	.55
CH	117.16	16.70	113.88	16.09	2.330*	.95	.96	.53	.60	.63	.66
SE1	15.29	3.18	15.38	2.30	-.359	.69	.64	.47	.57	.62	.62
SE2	17.93	3.55	18.58	2.65	-1.921	.75	.76	.30	.38	.43	.43
SE3	18.45	3.72	18.68	3.18	-.579	.74	.81	.26	.32	.35	.36
SE4	12.22	2.90	13.00	2.30	-2.830**	.69	.64	.36	.42	.45	.46
SE5	13.88	2.80	15.50	2.31	-5.554***	.57	.70	.25	.32	.36	.36
SE6	12.14	3.52	12.97	2.73	-2.736**	.79	.79	.41	.51	.56	.58
SE	89.91	14.21	94.11	12.87	-3.136**	.90	.92	.39	.47	.51	.53
BM1	12.55	3.13	12.82	2.85	-.902	.75	.84	.36	.45	.49	.52
BM2	18.10	5.01	17.53	3.76	1.325	.87	.85	.43	.51	.55	.58
BM3	9.98	2.66	10.16	2.53	-.680	.73	.82	.39	.45	.48	.50
BM4	15.42	3.83	15.62	3.44	-.535	.80	.86	.37	.45	.49	.54
BM5	10.03	2.71	10.27	2.29	-.938	.72	.76	.37	.46	.50	.52
BM	66.08	15.01	66.40	13.67	-.239	.94	.95	.45	.54	.58	.62

Notes: α = Cronbach alpha. r_{1p} , r_{2p} , and r_{3p} = correlations based on 1, 2 (averaged), or all 3 peers, respectively. r_{3p**} = well-known peers only ($N=95$).
 * $P < .05$, ** $P < .01$, *** $P < .001$.

demanding circumstances (CH3) than they are seen by their acquaintances. Regarding *seriousness*, the peer-ratings exceeded the self-ratings significantly for three facets and the seriousness scale. Not surprisingly, peers and subjects disagreed regarding the subjects' nature of the communication style (SE5), which peers perceived as being more sober and object-oriented than the subjects themselves did (sample items: "When I communicate with other people, I always try to have an objective and sober exchange of ideas," "I prefer people who communicate with deliberation and objectivity"). Furthermore, subjects — as compared to their peers — underestimated their tendencies to prefer sensible and useful activities (SE4), and their sticking to a serious frame of mind in the presence of active elicitors of cheerfulness (SE6). For *bad mood* no significant differences could be found.

With regard to the self-peer correlations, Table 12 shows that the scales of the STCI-T <106> were sufficiently highly correlated (.63, .51, and .58 for cheerfulness, seriousness, and bad mood, respectively). Restricting the data set to peers who know the target person well (steps 1 to 5 on the 9-point rating-scale) yielded higher coefficients (.66, .53, and .62, respectively). Likewise, the size of the coefficients increased as a function of the number of peers; the average coefficients for one peer were lower than those for two peers, which, in turn, were still lower than the results reported above. Finally, the degree of reliability was accounting for differences as well. This is evident in two findings: (a) the coefficients for the more reliable scales (and facets) of cheerfulness and bad mood were higher than for seriousness (which, additionally, had a reduced variance in the present sample as compared to the other samples again lowering convergence, see Tables 2 and 7); and (b) the congruence between self- and peer-report was lower for the (less reliable) facets than for the scales; the coefficients ranged from .35 (SE3) to .63 (CH1, CH2), with a median of .50.

Thus, one can expect that the coefficients reported above do not represent the very upper limit of the equivalence of self- and peer-reports. In any case, cheerfulness, seriousness, and bad mood can be regarded as concepts which can be assessed via self- and peer-report and they converge to a known level.

Conclusions

The present article was aimed to pursue two separate goals. First, a model was outlined comprising the concepts postulated to form the

temperamental basis of the sense of humor and the basic structural relationships were subsequently tested in several samples. Second, different forms of the trait part of the inventory for the assessment of cheerfulness, seriousness, and bad mood (and their facets) were constructed, and their psychometric characteristics were evaluated and examined for replicability. With regard to the first goal it can be concluded that the postulated facet structure is confirmed and largely generalizable across different methods of estimating similarity (empirical correlations versus rating of perceived similarity), different perspectives (self versus peer evaluation), and different subgroups (males versus females, Germans versus Americans). The facets of the three concepts appeared to be homogeneous and the direction and strength of the relationship among cheerfulness, seriousness, and bad mood essentially followed the predictions.

Regarding the second goal, the construction of the standard and long (or component) form of the trait part of the STCI was successfully completed. The psychometric characteristics of the facets and scales appeared to be satisfactory and proved to be replicable. All scales and subscales were normally distributed and had sufficient to excellent internal consistency; however, studies on test-retest reliability are still lacking. Only minor adjustments were necessary to make the STCI-T employable in peer-evaluation studies. The resulting test characteristics were satisfactory and so was the congruence between self- and peer-evaluation. An English translation of the STCI-T <106> (the facet version) was achieved and will undergo a comparable construction procedure.

The step to be undertaken now is to validate the instrument in a variety of settings. The validation of the trait part will include the study of the relationships with general personality models, with general dimensions of affectivity, and with more specific dimensions of similar scope. More important, the validation in the field of humor will comprise the study of the relationship with sense of humor inventories (see Köhler and Ruch, this issue), with humor performance tests (for example, Ruch 1994b), and the prediction of humor-related behavior in experimental settings (all aimed at examining the assumption that the three concepts form the temperamental basis of the sense of humor).

Further research activities will have to deal with the construction and validation of the state version of the STCI. The latter will include the examination of the hypothesized positive relationship between homologous states and traits, the experimental variation of the states and their

subsequent effects on humor-related behavior and experience, and the interactions between states, traits, and situational factors. The already existing data seem to support the utility of the concepts and the validity of the inventory.

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Notes

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- 1. The German label of the inventory is *STHI* (*State-Trait-Heiterkeits-Inventar*); however, for sake of comparability the English name will be used in the present manuscript.
- 2. Only abbreviated versions of the facets are given. As an example, the full version of CH3 goes: "The trait-cheerful individual ... has a positive and carefree outlook on life, can unwind well, and enjoys the present moment. He/she can accept even unpleasant circumstances calmly and with composure, can look on the light side of things and is able to find something positive in them."
- 3. This incompatibility is, of course, even more true for the prototypical behavioral expressions of laughter (cheerful) and crying (sadness), which, however, may alternate more quickly in a behavioral sequence than the corresponding moods do.
- 4. The root of the German term "*ernst*" (*ernest*, *ernust*) is relating to being "ready to fight," "firmness in fight."
- 5. While the formulations of the facets SE6, BM3, and BM5 related *explicitly* to *non-cheerful* behaviors and attitudes, the facets SE1, BM1, BM2, and BM4 *implicitly* refer to *non-cheerful* mood (by emphasizing the *prevalence* of states of seriousness and bad mood). In order to partially correct the overestimation of the dissimilarity, the mean coefficients between the three dimensions were computed again, excluding the three "non-cheerful" facets of SE6, BM3, and BM5. The average coefficients decreased to $-.31$ (CH versus SE) and $.10$ (SE versus BM), but, of course, did not change for CH versus BM.
- 6. Cheerfulness facet CH3 (composure) had a significant age trend as well in a form comparable to the one of seriousness ($F[5,588] = 5.66$, $p < 0.0001$). This

trend is plausible since one would expect that life experience (maturity, wisdom) increasing with age forms one basis for composure. While the youngest age groups were lacking in composedness, this facet seems to signify the cheerfulness of the elderly. Bad mood facet BM3 (sadness in cheerful situations), which loaded on the seriousness factor, increased with age as well in the form comparable to the one of seriousness ($F[5,588]=2.50$, $p=.0295$).

7. We express our gratitude to Gretchen Stein for carrying out this translation, lively and with commitment.
8. This should *not* be attributed to the peer-evaluation form per se but seems to constitute a peculiarity of the sample in which cheerfulness and bad mood were too highly negatively correlated. The low loading of facet CH3 (.23) was observed in the self-evaluation for this sample as well. Thus, not surprisingly, the PHI coefficients for self- and peer-evaluations indicate that the structure of the facets in the two forms is highly comparable (CH: .93, SE: .98, and BM: .96).

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